



Probability-based Design for Selecting Sampling Sites

Key Questions Conducive to the Probability-based Design

Question 1: What % of the Nation's wadeable streams resource is in good condition?

Question 2: What is the relative importance of stressors as evaluated in the WSA?

Goals

Produce a report on the condition of wadeable streams of the U.S. by December 2005

Promote collaboration across jurisdictional boundaries in the examination and assessment of water quality

Build State capacity through use of survey design and comparability of methods or indicators

A Probability-based Design for the WSA

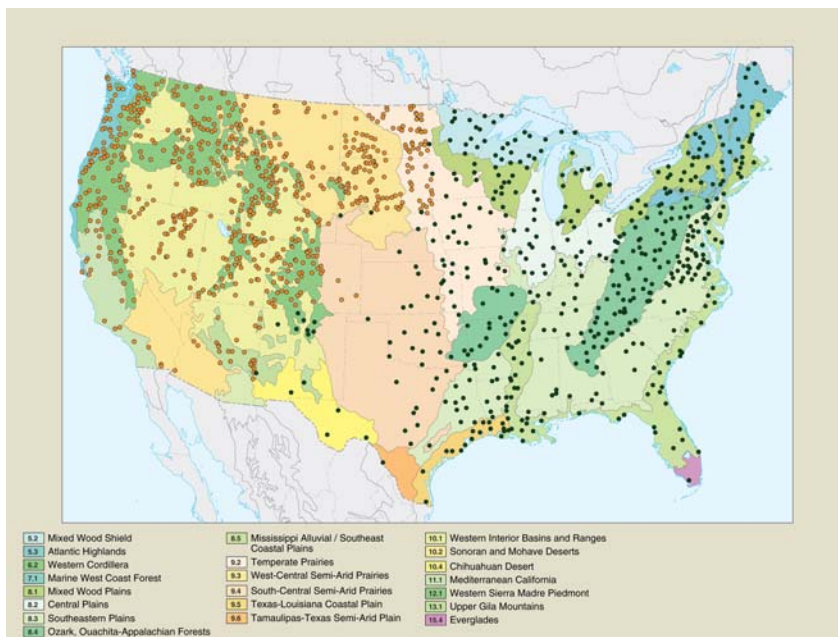
The results of the Wadeable Streams Assessment (WSA) will be used to characterize the ecological condition of small streams throughout the U.S. When a target population such as all wadeable streams of the U.S. is too large to implement a census of each and every stream, a random sample can be used. The WSA is designed like an opinion poll: 1100 sites were selected at random to represent the condition of all streams in regions that share similar ecological characteristics. This is the first time a national monitoring study of streams has

What is a Probability-based Design?

- ✓ A procedure for selecting a representative set of streams so that inferences can be made for all streams with known confidence.
- ✓ Statistically derived survey that ensures spatial dispersion within this population.
- ✓ All streams have a known probability of being included in the sample.
- ✓ Statistically-valid survey design is stratified to allow estimates of the condition of streams throughout each Level II Ecoregion, EPA region, and major drainage basin.

What are the Design Parameters of the Sample Survey?

- ✓ The target population is perennial, wadeable streams and rivers in the conterminous U.S.
- ✓ Stream segment lengths and Strahler order are assigned, and a hierarchical weighting system is used to determine the specific coordinates for each site being sampled.
- ✓ To provide a representative sample of all streams within the U.S., the WSA must include all types of natural streams for possible sampling within each geographic region. Thus the final sample selection in the WSA will include a diverse selection of streams that vary in size, flow, and degree and type of disturbance

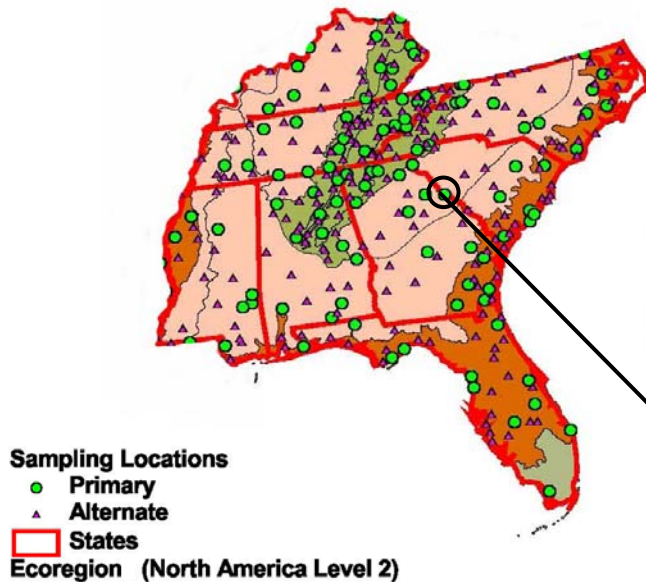


Sites Randomly Selected in Ecoregions of the U.S. for the WSA

- Western sites sampled prior to 2004
- Eastern sites sampled in 2004

Process for Evaluation/Replacement of Sites in Probability-based Surveys

(Example EPA Region 4)

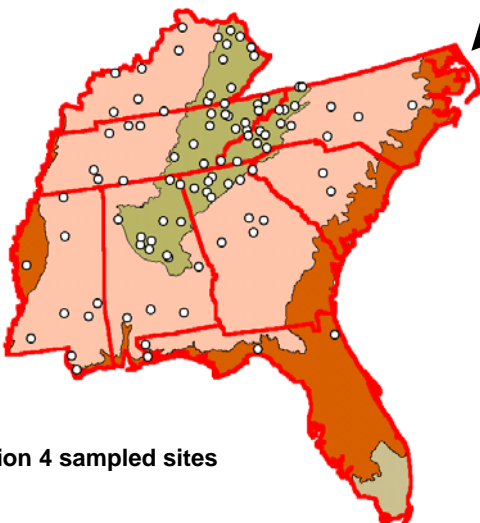
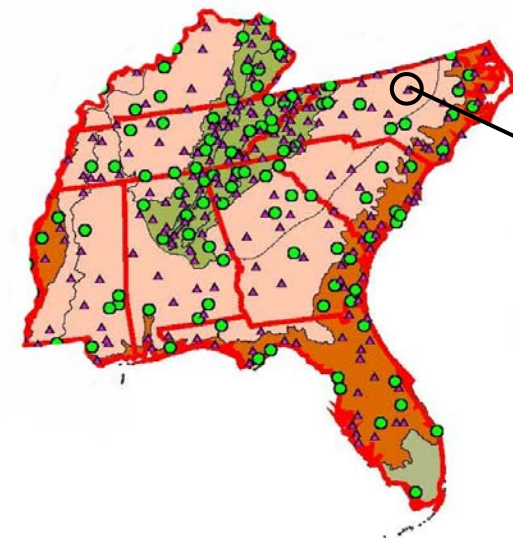


1. Primary and alternate stream sites are randomly selected using a statistically derived GIS grid overlay on streams delineated in the National Hydrography Dataset throughout each reporting unit (e.g., EPA Region, Level II Ecoregion, State).

2. Primary sites are evaluated for acceptance as target. Stream sites are considered non-target if non-perennial, too deep, tidal, wetland, conveyance canal, no access, or unsafe conditions (fire, flooding).

3. When primary sites are discarded, alternate sites are selected in sequence and are evaluated the same as primary sites.

4. Site evaluation and replacement continues until approximately 50 sites per reporting unit are obtained and sampled.



○ Region 4 sampled sites



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